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Intergenerational Time Transfers and Internal Migration: Accounting for Low Spatial Mobility in Southern Europe

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Abstract

This paper examines the hypothesis that living close to grandparents is optimal for Southern European young couples with children in which the wife works given the combination of, on the one hand, substantial help flows in the form of grandparenting and, on the other hand, the shortage in the provision of formal childcare services in these countries. I develop a partial equilibrium job search model that incorporates these findings. Simulation results show that a reduction in the price of private childcare services is more effective in increasing women's employment, fertility and inter-regional migration rates than an increase in the availability of publicly funded childcare slots. Using ECHP data I find that families with children in which the wife works move significantly less than equivalent childless couples only if they live in a Southern European country. That effect is found for both inter- and intra-regional migrations but is substantially larger in the former case.

JEL Classification: J13, J22, J61.

Keywords: Geographic labour mobility, Intergenerational transfers, Child care, Grandparenting, Labour Supply.

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1 Introduction

Inter-regional mobility rates are lower in Europe than in the United States. Within Europe, Southern countries like Greece, Italy and Spain stand out for the low mobility of their population. Young adults and the highly educated are the most mobile groups in any country. However, inter-regional mobility rates for these two collectives in Greece and Spain are lower than those for the old and the less educated, respectively, in France, Germany and the United Kingdom (OECD, 2005). Although promoting spatial mobility is not an end in itself, it is an important policy issue in countries, like Southern European ones, where regional disparities are pronounced (OECD, 2005).

The research on low internal migration has focused on institutional factors such as the unemployment insurance system or the homeownership structure. These factors are thought to make workers more geographically attached, thus reducing internal migration. The evidence is, however, mixed.

For unemployment benefits, the attachment arises due to the disincentive search effort effect. Unemployment benefits raise the value of being unemployed, thus increasing reservation wages and lowering search effort (Mortensen, 1977). Hassler *et al.* (2003) argue that the difference in the generosity of unemployment benefits can explain the difference in mobility rates between the United States and Europe, where Europe is characterized by more generous benefits and lower mobility. Antolin and Bover (1997) find, using data for Spain, that unemployed men registered at the public employment office are less likely to move than those not registered. That finding is interpreted as evidence supporting the hypothesis that benefits reduce mobility since being registered is a necessary condition for receiving benefits in Spain.

On the contrary, Barron and Mellow (1979) show that benefit recipients reduce search time but increase the productivity of time spent on job search through the increased expenditure afforded by benefits. Wadsworth (1991) also finds, using data for the United Kingdom, that benefits can enhance job-matching efficiency by improving job search productivity. Tatsiramos (2004) and Goss and Paul (1990) find, using data for several European countries and for the United States, respectively, that unemployment benefits have no net impact on mobility. Benefit recipients reduce search time but have an additional source of income to finance mobility costs.

Housing tenure is also stressed as a factor determining spatial mobility. Barcelo (2003) using pooled data for several European countries, Gobillon (2001) for France and Gardner *et al.* (2001) for the United Kingdom, among others, have shown that housing tenure affects unemployed workers' incentives to accept a job involving a residential change. They find that renters living in social housing and, in particular, owners, are more reluctant

to move for job-related reasons. At the macroeconomic level, however, no relevant cross-country correlation is found between differences in the distribution of households across housing tenure regimes and discrepancies in inter-regional migration rates.¹ Ownership rates in the United Kingdom and the United States are quite close to those for Greece and Italy. Additionally, the former two countries plus Sweden are at the top of the distribution when ownership and social renting are jointly considered.

This paper presents a novel hypothesis to explain the low inter-regional mobility that characterizes Southern European countries by focusing on the factors determining the mobility of the most mobile group: emancipated young adults. I argue that Southern European young couples with children in which the wife works take advantage of the low labour force participation rate of their own mothers to reconcile work and family life and, thus, are more reluctant to move to another region than their counterparts living in other developed countries.

Couples with children in which the wife works living far from their relatives lose the childcare services the latter provide, which dampens mobility when alternative services of similar cost and quality are unavailable.² This disincentive migration effect is likely to be particularly relevant in Southern Europe for two reasons. First, these countries have the highest stock of potential caretakers within the family network, since they have the lowest labour force participation rates of women aged over 45 years old within developed countries. Second, publicly provided childcare is severely rationed in these countries, both in the number of places available and in the number of hours of care offered, and, due to strict regulations, private provision is scarce.³

Data from the Survey of Health, Ageing and Retirement in Europe (SHARE) and the United States Household and Retirement Study (HRS) are used to show that time transfers in the form of grandparenting are substantially higher in Southern European than in other developed countries. The time that Southern European grandmothers devote to take care of their grandchildren increases when the mother is employed and remains at high values even after the grandchild is enrolled in formal education.

I develop a partial equilibrium job search model in which couples make fertility, female labour supply and inter-regional migration choices taking as given the availability of different childcare arrangements. The model assumes that family caretakers, i.e. grandmothers, do not migrate with the couple, thus making couples with children and access

¹Cross-country data on the distribution of households across housing tenure regimes is taken from Trilla (2001).

²In a related framework, Munshi and Rosenzweig (2005) find that low spatial and marital mobility in rural India is due to the existence of caste networks that provide mutual insurance to their members. Households that out-marry or migrate lose the services provided by these networks, which dampens mobility when alternative sources of insurance or finance of similar quality are unavailable.

³See Del Boca *et al.* (2004) for a comparison of childcare systems in several developed countries.

to grandparenting more reluctant to migrate. I use the model to simulate the effects of several experiments such as an increase in the availability of publicly financed childcare slots.

Finally, I use data from the European Community Household Panel (ECHP) for the period 1994-2001 to analyze the migration decisions of families living in countries characterized by different childcare arrangements. Estimates show that families with children where the wife works move significantly less than equivalent childless couples only if they live in a Southern European country. This effect is found for both inter- and intra-regional moves, but is substantially larger in the former case. The inter-regional deterring effect of the wife working, having at least one child and living in Southern Europe is larger than the homeownership effect.

The paper is organized in five sections. Section 2 links cross-country differences in internal migration with differences in female labour force participation, time transfers within the family network and the provision of organized childcare services. Section 3 develops a partial equilibrium job search model that incorporates time transfers within the family network. Section 4 presents and discusses the microeconomic evidence and, finally, Section 5 concludes.

2 Macroeconomic evidence

This section describes the available evidence on cross-country differences in internal migration and documents that developed countries with the lowest inter-regional migration rates are those with the highest levels of the following variables: percentage of emancipated women living close to their mothers; help flows from the mother to her emancipated daughters in the form of grandparenting; intergenerational gap in female labour force participation, and degree of rationing in the provision of public childcare services. Furthermore, intra-regional migration rates in these countries are close to those for other developed countries and a low proportion of women remain childless at the end of their fertile period.

2.1 Cross-country differences in internal migration

There is significant variation in internal migration within developed countries. Table 1 shows that inter-regional gross migration flows are lower in Europe than in the United States. In Europe, however, the situation is not uniform across countries. While the United Kingdom stands out for its high inter-regional migration flows, Southern European countries do so for the reduced proportion of their populations that change region of residence over the year.

Young adults and the highly educated are the most mobile groups in any country (columns 2 and 6). Inter-regional migration flows for the young and the highly educated in Greece and Spain are lower than those for the old and the less educated, respectively, in France, Germany, the United Kingdom and the United States. On the contrary, intra-regional migration rates in Southern Europe are close to those for other large European countries (column 3). That is, low mobility is not a distinctive feature of Southern European countries when mobility is defined over shorter distances.

2.2 Internal migration and intra-family time transfers

Finding cross-country comparable data on time transfers within family members is not an easy task. Recently, the Survey of Health, Ageing and Retirement in Europe (SHARE) has provided us with such data for several European countries. SHARE is a longitudinal, multidisciplinary and cross-national survey representing the population of individuals aged over 50 years in Europe.

The first wave of SHARE took place in 2004 with ten participating countries: Austria, Germany, The Netherlands, France, Switzerland, Sweden, Denmark, Greece, Italy and Spain. Respondents provided detailed information on their, their partners' and their children's sociodemographic characteristics and labour status. They were also asked about the residential location of their children, the frequency of contacts with them and the time and monetary transfers they give to and receive from them. I also use the Health and Retirement Study (HRS) to obtain comparable indicators for the United States.⁴ Respondents aged over 70 years are excluded since they have increasing health difficulties and net time transfers may flow in the opposite direction, that is, from the emancipated children to their parents.

According to Table 2, emancipated women live closer to their mothers in Southern Europe than in other developed countries. Less than 20 percent of emancipated women aged 20 to 35 years live more than 25 kilometers away from their mothers in Southern Europe. That number is more than 20 percentage points lower than those for France, Sweden and the United States, and more than 10 percentage points lower than that for Germany.

Over half of all grandmothers in any European country report that they devote some time every week to take care of their grandchildren (column 2). That proportion is reduced to approximately one third in the United States. The singularity of Southern

⁴The English Longitudinal Study on Ageing is the equivalent survey for the United Kingdom. That database is not included in the analysis since it does not include information about the residential location of emancipated children and grandparenting time cannot be properly isolated from help flows to other family members, neighbours or friends.

Europe emerges when looking at the proportion of grandmothers taking care of their grandchildren on a daily basis. Approximately one out of two Greek and Spanish grandmothers that take care of their grandchildren do so almost every day. In Italy, it is almost two out of three grandmothers. The corresponding percentages for French and German grandmothers are, approximately, 30 percentage points lower than those for Spain and Greece. That difference amounts to around 45 percentage points when Southern European grandmothers are compared to their Swedish counterparts.

Cross-country differences in the frequency of grandparenting translate into differences in the average number of weekly hours of grandparenting. At the top of the distribution, Greek grandmothers devote, on average, 36 hours a week to take care of their grandchildren. Close to the Greek record are Spanish and Italian grandmothers with approximately 25 hours per week, on average. Grandmothers from other countries are quite far from these numbers, particularly so those from Sweden and the United States.

The last two columns in this table show that emancipated women living closer to their mothers in France and Germany receive, on average, six hours more of grandparenting time per week than those living further. That difference amounts to, at least, 15 hours per week in Southern Europe. On the contrary, mothers in Sweden and the United States receive a fairly low amount of grandparenting time no matter their residential location.

Table 3 further analyzes grandparenting time by focusing on women living “close” to their mothers, that is, those living less than 25 kilometers away from them. Grandparenting time is higher if the mother is employed, particularly so in Greece, where working mothers receive an average number of weekly hours of grandparenting equal to the 40-hour standard working week in that country. On the contrary, grandparenting time in Sweden and the United States is low regardless of the employment status of the mother.

Finally, grandparenting time remains at high values in Southern Europe even when the youngest grandchild is enrolled in formal education and aged over 6 years. The relevance of non-parental care for children enrolled in formal education is likely to be higher in countries, like Southern European ones, with a longer standard number of working hours and a lower proportion of part-time contracts.⁵

This empirical evidence supports the hypothesis that, within developed countries, time transfers in the form of grandparenting are highest in countries with the lowest inter-regional migration rates. The opportunity cost of living far from their mothers is higher for Southern European working mothers than for their counterparts living in other developed countries.⁶

⁵See OECD (2002) for a comparison of the labour market performance of women in OECD countries.

⁶The opportunity cost of living far from their mothers would be zero if they receive monetary transfers that compensate them for the grandparenting time they do not receive when living far from their mothers. Own calculations using SHARE data show that only four percent of families living far from the

Before moving to the next piece of evidence there is one question to answer: Why do grandmothers take care of their grandchildren? Altruism might be an explanation, but that behaviour can also be explained if generations are selfish. Rangel (2003) explains intergenerational transfers in the latter case by distinguishing between forward and backward intergenerational goods (FIGs and BIGs, respectively). The former category includes transfers from present to future generations, like parental investment in education or, in this context, help flows from the grandmother to her children. On the contrary, BIGs are transfers from the future to the present generation such as pay-as-you-go social security or taking care of elderly parents.

Rangel (2003) shows that BIGs generating a positive surplus are self-sustainable on their own, but FIGs never are. However, even with selfish generations, optimal investment in future generations can take place if the equilibrium social norm links BIGs and FIGs. In this context, help flows from the grandmother to their children are self-sustainable if generations are selfish and the family norm states that taking care of grandchildren is a prerequisite for the grandmother to be cared by their children when older.^{7,8} The migration deterring impact of living in a Southern European country for couples with children would be higher than expected if help flows in the form of grandparenting are just the first part of an intergenerational contract stating that the couple have to take care of the grandmother when older.

2.3 Internal migration and female labour force participation

Table 4 presents labour force participation rates by sex and age groups for several large developed countries. While male participation rates are quite similar across countries, female participation rates are far more disperse. Furthermore, while the participation rate of Southern European women aged 25 to 34 years is close to the OECD average for that collective, that for women aged over 45 years is, on average, 40 percent lower than the corresponding average. That is, Southern European countries stand out for showing

maternal grandmother receive monetary transfers from her. Moreover, the cross-country dispersion in that percentage is low. I consider monetary transfers different from those intended to help daughters to buy a house, those related to a major family event (marriage, divorce, birth), to help with unemployment, for further education or to meet a legal obligation.

⁷This is an example of a self-enforcing family constitution (Cigno, 1993). The family constitution prescribes the transfers that each generation should make and it is self-enforcing because it is in each generations's self-interest to comply with its prescribed actions. That is, it supports a sub-game-perfect Nash equilibrium.

⁸Iacovou (2000) shows, using ECHP data, that the percentage of Southern European women aged 80 and over who live with their children ranges from 30 percent in Italy to 45 percent in Spain. The corresponding percentages for France, Germany, the United Kingdom and Denmark are 16, 12, 10 and 3 percent. That is, help flows are also more relevant in Southern Europe when they move in the opposite direction.

the most pronounced intergenerational differences in female participation rates. In fact, that differential is not relevant in any country but in Southern European ones.

The same picture emerges when analyzing employment rates in Table 5. Female employment rates are lower in Southern Europe, particularly so for those aged over 45 years, and the cross-national dispersion in males employment rates is much lower than that for women.

These findings can be explained by considering the relevant intergenerational differences in female educational attainment found in Southern European countries. As shown in Table 6, less than 10 per cent of Southern European women aged 55 to 64 years have attained tertiary education. The corresponding percentages for other developed countries ranges from approximately 15 per cent in France or Germany to more than 30 per cent in North American countries.

Female enrollment in tertiary education began late in Southern Europe but it has grown rapidly. Spain is a paradigmatic case. While the percentage of Spanish women aged 25 to 34 years who have attained tertiary education is slightly higher than that for the United States, that for Spanish women aged 45 to 54 years is less than half of the corresponding percentage for the United States.

This empirical evidence supports the hypothesis that Southern European countries are those with the highest stock of potential caretakers within the family network, i.e., women aged over 45 years not participating in the labour market. Furthermore, it also shows that the proportion of working women with non-participating mothers is higher in Southern European than in other developed countries.

The correlation between cross-country differences in inter-regional migration rates and in the participation rate of women aged over 45 years old is approximately 0.75. This correlation is substantially higher than those obtained when differences in inter-regional migration rates are correlated with those in the participation rate of other sex and age groups in Table 4. The same holds when considering cross-country discrepancies in employment rates.

2.4 Internal migration and the market provision of childcare services

Greater access to help flows within the family network only dampens mobility when alternative services of similar cost and quality are scarce or unavailable. As previously discussed, publicly provided care for young children in Southern Europe is severely rationed both in the number of places available and in the number of hours of care offered and, due to strict regulations, private provision is scarce.

As shown in Table 7, Southern European countries are those with the lowest number of publicly provided childcare slots for children under three years per hundred children and, at the same time, those with the lowest proportion of preschool children using formal (public or private) childcare services. childcare arrangements vary considerably across countries. While these services are mainly publicly provided in most Central and Northern European countries, private caretaking is the most frequent childcare arrangement outside the family network in the United Kingdom and the United States.

The cross-country correlation between inter-regional migration rates and the proportion of preschool children using formal childcare arrangements is 0.74.

2.5 Internal migration and the presence of children

This paper attempts to explain the low mobility that characterizes Southern Europe relative to other developed areas by focusing on cross-country differences in childcare arrangements. The aggregate relevance of this hypothesis, thus, rests on there being a significant proportion of young couples with children in these countries. Kohler *et al.* (2006) document that Italy and Spain were the two first countries to attain and sustain below-replacement fertility levels in the early 1990s. Greece reached that condition in the late 1990s. As shown in Table 8, the low fertility that now characterizes Southern Europe has not translated into a high level of childlessness relative to other developed areas.⁹ In fact, the proportion of Southern European women who remain childless when aged 40 to 45 years is well below that for other developed countries with a higher total fertility rate like Finland, Sweden and the United States. Thus, Southern European women are more likely to have children, but they have less children.

2.6 Summary

This section documents that Southern European countries, which have the lowest inter-regional migration rates, are also countries:

- where intra-regional migration rates are close to those for other developed countries.
- with the highest intergenerational differences in female labour force participation and employment rates.
- where time transfers in the form of grandparenting are the highest.
- with the highest percentage of emancipated women living close to their mothers.

⁹See Bettio and Villa (1998) for an analysis of the relationship between female labour force participation and fertility in Southern European countries.

- with the lowest provision of public childcare services.
- where a low proportion of women remain childless at the end of the fertile period.

In the next section I develop a theoretical model that addresses these findings.

3 The model

The goal of the model is to analyze the impact that different types of childcare arrangements have on the migration behaviour of families with children. The model is based on that in Barcelo (2003). However, here the unit of analysis is not the individual but the couple, and childcare provided by close relatives replaces ownership as the factor deterring mobility. The model is solved by numerical methods since it cannot be solved in closed form. For simplicity, I present a two-period model.

3.1 Model setup

There are two regions in the economy, A and B . The unit of analysis is a childless couple deciding about: the region of residence, whether to have a child or not, and the wife's employment status.¹⁰ To keep the model simple I assume that husbands are always employed.¹¹ However, on-the-job search is allowed for.

Let λ_U and λ_E be the probability of getting a job offer each period an individual is unemployed and employed, respectively. An individual can receive at most one offer in each region every period. Employed wives lose their job with probability δ . The random layoff rate and the job offer arrival rates are assumed to be the same in both regions. Furthermore, arrival rates are also assumed to be the same for both spouses.

Let T denote the “standard” number of hours associated with a job and let $w_{1,t}^j$ and $w_{2,t}^j$ represent the husband's and wife's wages if employed in region $j = \{A, B\}$ in period t . These wages are randomly drawn from the distribution function of husbands' and wives' wage offers $F_1(w_1)$ and $F_2(w_2)$, respectively, assumed to be independent of each other.¹² Wage offers for husbands (wives) are independent and identically distributed across husbands (wives) and across regions.

I take the division of labour to be exogenous and assume that only women devote time to childcaring. Apart from maternal time, two additional inputs can be used in the production of childcare services: time transfers provided by close relatives (unpaid

¹⁰Rather than model the matching of men and women, I assume that couples are “born” as such.

¹¹Hereinafter I refer to both members of the couple as husbands and wives, respectively. However, the model includes couples that are either married or living in consensual union.

¹²The independence of these two c.d.f.'s is not essential to obtaining the results reported in the paper but it simplifies the analysis.

childcare) and childcare services provided outside the family network (paid childcare).¹³ The latter includes both public and private caretakers.

Following Wrohlich (2006), I assume that rationing only affects public childcare. Rationing is explicitly modelled by assuming that public childcare is not only characterized by a subsidized hourly price, denoted by π_1 , but also by its availability.¹⁴ The probability of getting a slot in the public sector is denoted by ρ . Couples can always find a private caretaker such as a nursery, a nanny or a babysitter that would look after their child at a sufficiently high hourly price denote by π_2 .

The wife cares for the child herself if she remains unemployed. If she becomes employed the couple consumes the total amount of childcare time provided by relatives and denoted by I . If unpaid childcare time is lower than the “standard” number of hours for a job, the couple apply for a public sector slot.¹⁵ If they are granted access, they pay the subsidized hourly price π_1 for the remaining mother’s working hours, that is, over $T - I$ hours. Otherwise, they pay the market price of childcare services for those hours.

Unpaid childcare is only available if the couple and their relatives live in the same region and never exceeds the mother’s working hours.¹⁶ Additionally, raising a child requires a monetary cost, denoted by φ . The monetary cost and the availability and cost of formal childcare services are assumed to be the same in both regions.

¹³Strictly speaking, this classification of child care arrangements is not correct. Child care provided by public institutions can also be for free, as it is the case in most European countries for low income families living in communities that have an income-dependent fee scheme to childcare facilities. Furthermore, child care provided by close relatives requires, at least, a transportation cost. The classification used in the model, however, stresses the fact that in most cases child care provided by close relatives is expected to be cheaper than that provided by formal caretakers.

¹⁴Del Boca and Vuri (2006) analyze the female employment consequences of rationing both in the access to formal child care and in the number of hours of care offered. I abstract from the latter source of rationing since its inclusion would just reinforce the results of the model. That is, I assume that whenever a couple is granted access to public child care they can buy the number of hours that they need to accomodate the wife’s working hours.

¹⁵The hypothesis that working mothers prefer to rely on the assistance of relatives is supported by a number of empirical studies. Joesch and Hiedemann (2002) analyze the factors that influence the demand for nonrelative child care among families with pre-school children in the United States. They find a negative and significant effect of having a relative other than those living in the household available to care for the child on both the probability of using formal care and the number of hours of care consumed. Furthermore, the marginal effect of having a close relative on both decisions is higher than those for the price of formal child care and the mother’s wage rate. Evidence in Chevalier and Viitanen (2003) for the United Kingdom is also compatible with that assumption. They test whether formal and informal child care arrangements are substitutes of each other by analyzing whether mothers using informal care are those that have been rejected from formal child care. They find that the bulk of mothers queuing for formal child care is represented by mothers using parental care. Coherent with that finding is the hypothesis that mothers with access to informal child care arrangements such as grandparenting do not queue for formal child care.

¹⁶Leisure is not included as an argument of the individual’s utility function and, thus, I do not consider situations where grandparenting time exceeds the mother’s working hours. Those considerations would be relevant to explain the relatively high grandparenting time enjoyed by non-employed Southern European mothers (Table 3).

Access to public childcare is assumed to follow a deterministic income-dependent scheme that can be written as follows:

$$\rho = \begin{cases} 1 & \text{if } w_{1,t}^j + w_{2,t}^j \leq \bar{w} \\ 0 & \text{if } w_{1,t}^j + w_{2,t}^j > \bar{w} \end{cases}$$

This eligibility criterion states that two-earner couples whose total income is above \bar{w} are not eligible for public childcare. This way of modeling rationing in the provision of public childcare is equivalent to assuming a limited number of publicly financed slots available but has some interpretation advantages in the context of a migration model.¹⁷

Couples are assumed to have joint consumption and joint utility. They derive utility from having a child and from consumption. The instantaneous utility function has a CRRA form. Childless couples' utility per period is as follows:

$$u(c_t / \text{childless}) = \frac{c_t^\alpha}{\alpha}$$

The corresponding instantaneous utility function for couples with a child has the same form but includes the additional term u_0 that captures the assumption that, for a given level of consumption, couples derive higher utility if they have a child:

$$u(c_t / \text{child}) = u_0 \frac{c_t^\alpha}{\alpha}$$

where $u_0 > 1$ and $\alpha > 0$.

In the initial period all couples and their families are assumed to live in region A and not to move. A couple has to live in the region where they work in order to achieve a positive level of utility. At the beginning of this period the husband is employed, the wife is unemployed and they have no children. The wife can just receive one job offer in region A with probability λ_U and they have to decide on her employment status (E or U) and whether they have a child or remain childless (CH or NCH). The decision set in $t = 0$ is:

$$D_0 = \left\{ (ch, E_1, E_2, w_{1,0}^A, w_{2,0}^A), (ch, E_1, U_2, w_{1,0}^A, b) \right\}$$

where $ch = \{CH, NCH\}$ and b refers to non-wage income such as unemployment benefits. The couple will choose the option belonging to the set D_0 which maximizes its expected

¹⁷Del Boca *et al.* (2004) model access to public child care in this way in their analysis of the child care choices made by Italian households. They show that access to public child care in Italy depends on parent's income and working status, among other factors.

intertemporal utility. The decision problem is described by the following Bellman equation:

$$\begin{aligned}
V_0 &= \max_{\{d_0, c_0\}} u(d_0, c_0) + \beta E[V_1(s_1, d_1^*) / s_0, d_0] \\
\text{s.t.} \quad & c_0 + [h_0^A (\rho \pi_1 + (1 - \rho) \pi_2) (T - I) + \varphi] n_0 = y_0 \\
& I \leq T, \rho = \{0, 1\}, d_0 \in D_0, s_0 = (NCH, E_1, U_2)
\end{aligned}$$

where n_0 and h_t^j are two indicator functions that equal one if the couple has a child, and if they live in region j in period t and the wife works, respectively, and y_0 is the couple's total income. Couples take into account that the optimal decision at $t = 0$ will affect their utility at $t = 1$ and discount it by the factor β .

The budget constraint states that if the couple has a child and the wife remains unemployed ($d_0^A = 0$), she cares for the child herself and the total cost of raising the child is simply equal to the monetary cost φ . If she becomes employed, rearing costs include both the monetary cost and the cost of childcare services. In that case, the couple consume available unpaid childcare time and, if it is not enough to cover the mother's working time, they pay the price of public childcare over $T - I$ hours or the market price if they are not granted access to public childcare.

At the end of the initial period, employed wives lose their jobs with probability δ . In the following period both spouses may receive offers from regions A and B . The decision set of two-earner couples with children status ch at the beginning of period $t = 1$ is:

$$D_1(ch, E_1, E_2) = \left\{ \begin{array}{l} (ch, E_1, E_2, w_{1,t}^A, w_{2,t}^A), (ch, E_1, U_2, w_{1,t}^A, b), \\ (ch, E_1, E_2, w_{1,1}^B, w_{2,1}^B), (ch, E_1, U_2, w_{1,1}^B, b) \end{array} \right\}$$

where $t = \{0, 1\}$. These couples can continue living in region A or move to region B . In the former case, they can continue working at the same jobs or quit and accept other better-paid jobs.¹⁸ The couple takes the decision d_1^* which maximizes their utility in period 1.

$$\begin{aligned}
V_1(s_1 = (ch, E_1, E_2)) &= \max_{\{d_1, c_1\}} u(d_1, c_1) \\
\text{s.t.} \quad & c_1 + [h_1^A (\rho \pi_1 + (1 - \rho) \pi_2) (T - I) + h_1^B (\rho \pi_1 + (1 - \rho) \pi_2) T + \varphi] n_0 = y_1 \\
& I \leq T, \rho = \{0, 1\}, d_1 \in D_1(ch, E_1, E_2)
\end{aligned}$$

¹⁸There is no wage growth in the model.

The new term in the budget constraint reflects the assumption that close relatives do not migrate with the couple and, thus, unpaid childcare is no longer available if the couple move to region B . Couples that gained access to public childcare in period $t = 0$ maintain that position if they continue living in region A , the wife works and they satisfy the income limit condition.

Equivalently, if the wife is unemployed at the beginning of period $t = 1$, the decision set of couples with children status ch is:

$$D_1(ch, E_1, U_2) = \left\{ \begin{array}{l} (ch, E_1, U_2, w_{1,t}^A, b), (ch, E_1, E_2, w_{1,t}^A, w_{2,1}^A), \\ (ch, E_1, E_2, w_{1,1}^B, w_{2,1}^B), (ch, E_1, U_2, w_{1,1}^B, b) \end{array} \right\}$$

where $t = \{0, 1\}$, with the couple's optimization problem now being:

$$\begin{aligned} V_1(s_1 = (ch, E_1, U_2)) &= \max_{\{d_1, c_1\}} u(d_1, c_1) \\ \text{s.t.} \quad c_1 + [h_1^A(\rho\pi_1 + (1 - \rho)\pi_2)(T - I) + h_1^B(\rho\pi_1 + (1 - \rho)\pi_2)T + \varphi]n_0 &= y_1 \\ I &\leq T, \rho = \{0, 1\}, d_1 \in D_1(ch, E_1, U_2) \end{aligned}$$

The structure of the model is summarized in Figure 1. This simple model illustrates how childcare arrangements affect family inter-regional migration. The model focuses on couples with preschool children, but it remains useful once the child is enrolled in formal education as long as non-parental care is still needed.

3.2 Solution of the model

Following Eckstein and Wolpin (1989), we can sequentially solve the Bellman equation backwards given the finite horizon structure of the model. In period $t = 1$, childless couples choose the highest consumption option from their choice set, no matter what the region where that option comes from. Both regions are identical in all respects for these couples and, thus, they are indifferent between living in region A or B .

Similarly, couples with a child choose the option providing the highest level of consumption. However, consumption is no longer equal to income but to income net of rearing costs. Any option involving a job for the wife provides higher utility to these couples if it comes from region A , since their relatives live in that region and, thus, childcare costs are lower in that region.

These couples may refuse the highest income option when it comes from region B due to the presence of a trade-off between the higher income they would earn and the

higher childcare costs they would face in that region. The increase in childcare costs when moving to region B is likely to be higher if the couple gained access to public childcare in the initial period. These couples would have to pay a higher hourly price for formal childcare services, i.e. that of private services, when moving to region B if the highest income option comes from that region, involves a job for the wife and exceeds the income limit for public childcare.

Mobility costs for couples with a child are increasing in the unpaid childcare time they receive from close relatives in region A , in the price of formal childcare services and decreasing in the income limit for public childcare. The higher the hourly price of formal childcare services the higher the cost of replacing unpaid childcare by formal alternatives in region B . The lower the income limit for public childcare the less likely it is that couples that gained access to public childcare move to region B in the following period.

Mincer (1978) refers to individuals that behave differently with regard to migration decisions because they are married as “tied”. Using a standard human capital model, he shows that there can exist a “tied stayer” or a “tied mover” in a particular family move. We define “tied couples” as those couples in which both spouses are forced to live in a region they would both emigrate from if they had not had a child.¹⁹ The greater the availability of unpaid childcare provided by immobile relatives, i.e. grandmothers, the higher the hourly price of formal childcare services and the lower the income threshold for public childcare, the higher the proportion of “tied couples” in the economy. Furthermore, the higher the mothers’ employment rate for given values of those parameters, the more relevant is the “tied couples” phenomenon.

Finally, the reservation wages that make wives unemployed at the beginning of period $t = 1$ indifferent between accepting a job or not do not depend on offer arrival rates, since couples are in the last period of their life, but depend on their children status. A childless wife would accept a job if she were paid more than her non-labour income, b , regardless of the region that the offer is coming from. The same holds for the wife’s effective wage, that is, her wage net of childcare costs, if the couple has a child. The mother’s reservation wage will be lower the lower is the hourly cost of formal childcare services and the higher is the number of publicly provided slots available. Likewise, the higher the availability of unpaid childcare, the lower the mother’s reservation wage for accepting a job in region A .

Moving backwards, I analyze the couple’s decision rule in the initial period. At the beginning of this period a couple comprises an employed husband and an unemployed wife with no children deciding on the wife’s employment status and whether to have a

¹⁹Mont (1989) develops a joint search model to analyze the two-earner childless family decision to migrate. He shows that both the husband and the wife can be tied stayers at the same time in the absence of children.

child or not.

The reservation wages that make them indifferent between the wife working or not depend on their children status and on the arrival rates. If, for a given children status, employed workers can change jobs more easily than the unemployed find a job ($\lambda_1 > \lambda_0$), wives will prefer to accept a job in $t = 0$ despite the fact that they are going to be paid less than their non-labour income b . Additionally, reservation wages also depend on childcare costs if the couple has a child. The lower the probability of gaining access to public childcare, the higher the price of formal childcare services and the lower the availability of unpaid childcare time, the higher the wife's reservation wage.

When deciding whether to have a child the couple compares the intertemporal utility they would enjoy, for a given wife's working status, with and without a child in the household. Having a child permanently increases the couple's utility for a given level of consumption but, at the same time, it reduces consumption via rearing costs. The latter depends on the monetary cost of raising the child (φ) and, if the wife works, on the income limit for public childcare, the hourly price of formal childcare services and the availability of unpaid childcare provided by close relatives. Higher values of φ increment the cost of having a child and, thus, the probability that the couple remain childless. The same holds for higher values of π_1 and π_2 and lower values of \bar{w} if the wife works. On the other hand, the higher is the preference for having a child (u_0), the more likely it is that they decide to have the child. The effect of unpaid childcare time is ambiguous. Greater access to unpaid childcare increases disposable income and, thus, the chances of having a child if the wife works in region A but, at the same time, reduces the probability of moving to region B in response to higher income options.

3.3 Simulation results

In this section I analyze the effect of permanent changes in parameter values. In particular, I run four experiments where I increase: the number of slots in public childcare centers, the price of public and private childcare services and the unpaid childcare time provided by close relatives. The analysis is performed conditioning on couple's total income.

The description of the benchmark economy is confined to the Appendix. Two-earner couples with children are the least mobile group in this economy. Their migration rate is half of that for the most mobile group: childless couples in which the wife is unemployed. Furthermore, over half of two-earner couples with children that move to region B do so in response to a higher consumption option that does not include a job for the wife. The corresponding percentage for childless two-earner couples is 20 percent. That is, migration rates for two-earner couples and, in particular, for those with children would be lower if

migration only occurs when moving to region B is Pareto efficient for both spouses.

In the first experiment I increase the number of publicly financed childcare slots by increasing the income limit for public childcare. This lowers both the mother's reservation wage and the expected cost of childcare services and, thus, increases the wives' employment rate and the fertility rate in the first period. The effect on the overall migration rate is, a priori, ambiguous. On the one hand, there is an increase in the size of the least mobile group but, on the other hand, that group becomes more mobile. The increase in the income limit for public childcare lowers mobility costs for couples that gained access to a public institution in the initial period and, thus, increases their propensity to move to region B .

Regarding the second experiment, an increase in the price of private childcare services increases both the mother's reservation wage and the expected cost of childcare services in the initial period, thus, reducing women's employment and the fertility rates. The expected effect on the overall migration rate is also ambiguous since the reduction in the size of the least mobile group comes with a reduction in the mobility of that group. The increase in π_2 increases the expected cost of replacing unpaid childcare time by costly alternatives in region B , thus reducing the propensity to migrate of two-earner couples with children, particularly so for those that gained access to public childcare.

The same holds for couples with children where the wife is unemployed at the beginning of period $t = 1$. The higher the price of private childcare services the lower the net income for options coming from region B and including a job for the wife. Furthermore, the higher π_2 the more likely it is that they continue living in region A if they receive one offer from each region including a job for the wife.

The expected consequences in the first period of an increase in the price of public childcare services are those for an increase in the price of private services. In the second period, the increase in π_1 lowers the expected cost of moving to region B in response to a higher income option exceeding the income limit for public childcare for families that gained access to public childcare in the first period. Conversely, the increase in π_1 does not affect the propensity to migrate of two-earner couples with children whose total income in the first period was higher than the income limit for public childcare. That is, the expected effect on the overall migration rate is positive since the increase in π_1 reduces the size of the least mobile group and increases its mobility.

Finally, I analyze the effects of an increase in the unpaid childcare time that couples receive from close relatives in region A . An increase in I lowers both the mother's reservation wage and the expected cost of childcare services in the initial period and, thus, increases the fertility rate and the female employment rate. The effect on the migration rate is clearly negative since the least mobile group increases its size and reduces its mo-

bility. Mobility costs for couples with children increase, particularly so for two-earner couples and, in particular, for those that gained access to public childcare.

Simulation results in Figures 2 to 5 indicate that the largest elasticities of the overall migration, female employment and fertility rates in response to changes in parameter values are obtained for changes in available unpaid childcare time and the price of private childcare services. On average, a one percent increase in available unpaid childcare time reduces the overall migration rate by 0.18 percent and increases the overall female employment and fertility rates by 0.15 and 0.26 percent, respectively. Equivalently, the elasticities of migration, female employment and fertility with respect to the price of private childcare services are 0.01, -0.27 and -0.27, respectively.

These results suggest that Southern European countries will experience an increase in the internal mobility of their population. The mechanism driving this result is the increase in women's educational attainment observed in these countries in the last few decades (Table 5). This process will lower the intergenerational gap in women's employment rates and, thus, the availability of caretakers within the family network that now characterizes Southern European countries. The reduction in I will lower mobility costs for couples with children and the option value of living close to the family for childless couples that expect to have a child.^{20,21}

The bad news is that the reduction in I combined with a severely rationed public childcare sector and the shortage in the private provision of these services, will make better educated Southern European women have a lower average number of children. That is, these countries will further reduce their fertility rates unless some policy initiative aimed at reconciling motherhood and working life is successfully implemented. Simulation results show that the reduction in the price of private childcare services is more effective at increasing women's employment rate, the proportion of couples with children and the overall inter-regional migration rate than the increase in the number of public childcare slots available.

The dramatic increase in the number of foreign immigrants living in Southern European countries since the late 1990s might partially solve this puzzle.²² The model predicts that foreign immigration will increase the fertility, the internal mobility and the female employment rate of the native population since foreign immigration increases the supply of unskilled labour and, thus, reduces the relative price of services that are intensive in

²⁰ As long as the cost of moving to another region is sufficiently high as to make that decision almost irreversible, living close to the mother has an option value for childless Southern European couples, that of waiting to have children and enjoying lower child care costs.

²¹ Furthermore, that mechanism will cancel the intergenerational contract suggested in Section 2 to explain why grandmothers provide help flows to their children.

²² In 2005, Spain and Italy received more than half of all net migration flows to the European Union (Eurostat, 2004).

unskilled time such as personal services like childcare services.

4 Microeconomic evidence

In this section I analyze the determinants of family migration by pooling data from the European Community Household Panel (ECHP) for the period 1994-2001. The ECHP is a representative panel of households and individuals in 12 European countries that covers a wide range of topics: demographics, employment, income, education, housing, migration, etc. This dataset is particularly useful for the analysis of spatial mobility since persons who move are followed to their new location.

The ECHP allows us to distinguish two types of residential moves within a country: moves within the same locality or area and moves to a different region. I aim at separately identifying the effect that the wife's employment status and the presence of children in the household have on shorter- (intra-regional) and longer-distance (inter-regional) family migration and to test whether these effects vary according to whether the family lives in a Southern European country or not.

Inter- and intra-regional migration rates for several European countries are presented in Table 9.²³ Inter-regional mobility rates calculated using the ECHP (columns 1 to 4) are not perfectly comparable to those taken from the OECD (column 5) since they are based on different definitions and refer to different years in some cases, but they follow the same pattern. Inter-regional migration rates are lowest in Southern Europe and highest in the United Kingdom. On the contrary, the cross-country dispersion in intra-regional mobility rates is substantially lower.

The same picture emerges when looking at couples in which both spouses are aged 25 to 45 years. The sample used in the estimation consists of couples that satisfy that condition one year before the survey. Furthermore, husbands are employed or looking for a job and wives can be either employed, unemployed or housewives. The information for the covariates is obtained from the year preceeding the year of the move, to properly distinguish the causes from the consequences of a move. The sample is further described in the Appendix.

4.1 Framework of analysis

Let y_{it} be a binary variable that takes the value of 1 if household i has moved to a different region within the same country within the year t , and zero otherwise. Following

²³I consider large countries for which the ECHP provides information on inter- and intra-regional family migration.

Tatsiramos (2004), we assume that there is an underlying response variable y_{it}^* that can be explained by the following regression

$$y_{it}^* = X_{it}\beta + \eta_i + \varepsilon_{it}$$

where X_{it} is a vector that includes relevant household characteristics such as housing tenure, the number of kids, the age, labour market status and level of education of both spouses, and where η_i is the unobserved time invariant household effect. The latent variable y_{it}^* represents the expected gain from migrating given observed characteristics. Whenever the expected gain is positive we observe a move ($y_{it} = 1$). The probability of that event conditional on covariates can be written as

$$\text{prob}(y_{it}^* > 0) = \text{prob}(X_{it}\beta + \eta_i + \varepsilon_{it} > 0) = F(X_{it}\beta + \eta_i)$$

where F is the cumulative distribution function of $-\varepsilon_{it}$.

Following Chamberlain (1980), this equation can be estimated using two alternative methods which differ in the assumptions they make about the relationship between the unobserved household effect and the covariates. The random effects probit estimator identifies β by using a linear regression function with normally distributed errors to model the dependence between η_i and X_{it} . Mundlak (1978) presents a version of this model where $\eta_i/X_i \sim \text{Normal}(\tau + \bar{X}_i\delta, \sigma_\phi^2)$, where \bar{X}_i is the average of X_{it} and σ_ϕ^2 is the variance of ϕ_i in the equation $\eta_i = \tau + \bar{X}_i\delta + \phi_i$. In practice, this model is equivalent to that in Chamberlain (1980) but including as additional regressors the mean of time-varying covariates.

Alternatively, a consistent estimate of β can be obtained using the fixed effects logit estimator. This estimator provides consistent estimates of the effect of time-varying regressors no matter what is the form of the dependence between the unobserved household effect and the regressors. Furthermore, it also deals with the potential endogeneity of time-varying regressors.²⁴

4.2 Empirical results

Random effects probit and fixed effects logit estimates for inter- and intra-regional family migrations are presented in Table 10. Each model is estimated by pooling the individual observations for the countries in Table 9 but for Germany.²⁵ The effect of interest is

²⁴It could be the case that individuals with a higher propensity to move in response to better economic conditions self-select into certain levels of formal education, children status, etc. Fixed effects estimators deal with the endogeneity of the included time-varying regressors as long as unobserved differences in individuals' propensity to move are time invariant.

²⁵Germany is excluded since two of the variables used in the analysis are not provided for individuals living there. Estimates were also performed excluding that variable from the analysis and including

that for the variable indicating that the couple has at least one child, the wife works and it lives in a Southern European country. That variable measures the differential effect that living in a Southern European country has on the migration behaviour of families where the mother works, restricting the effect of the other variables to be constant across countries.

The specifications control for the age of the husband, both spouses' levels of formal education and employment status, their children status and whether they own their dwelling or they rent it. Additionally, I also control for their migration record with two indicator variables that equal one if the husband or the wife live in the same region since birth, respectively, and zero otherwise. Spouses who have never changed their region of residence are likely to deter the family's propensity to move to another region since an individual's attachment to a location is likely to increase the longer he or she resides there.²⁶

Random effects estimates show that the propensity to move to a different region decreases as the age of the husband increases.²⁷ The effect of tertiary education is positive and slightly higher for husbands than for wives. Higher education has a positive effect on the family's propensity to move to a new location, specially to another region. Highly educated individuals can change jobs more easily and have access to the national labour market as compared to the low skilled who tend to search more in their local labour market.²⁸

Homeowners are less likely than renters to move. As discussed in Barcelo (2003), homeowners pay a lower price than renters for housing services and face a higher mobility cost since they have to sell their home to move to a new location. Additionally, families in which at least one spouse has always lived in the same region are less prone to move, specially to another region. This effect is larger when it is the wife who has never changed region of residence.

Families in which the husband works are more prone to move, within or outside their region of residence. The effect of the wife's employment status depends on the presence of children in the household. First, families in which the wife works have a higher probability of moving to a new location within the same region if they have at least one child in the household. That effect is found independently of whether the family lives in a Southern

families living in Germany and results were qualitatively identical to those reported in the paper. The variables in question are the migration records of both spouses.

²⁶Hassler *et al.* (2003) use that assumption to develop a dynamic general equilibrium model that accounts for cross-country differences in geographical mobility.

²⁷The output of the random effects model includes parameter ρ , which is defined as the proportion of the total variance contributed by the household-level variance component. When ρ is zero, as is the case for some estimations, the household-level variance component is unimportant and the panel estimator is equivalent to the pooled probit estimator.

²⁸Schwartz (1973) finds that within a given age group the deterring effect of distance declines with education.

European country or not. Second, the presence of children in the household lowers the probability of moving to another region for Southern European families in which the wife works.

The picture changes somewhat when looking at the fixed effects estimates.²⁹ These estimates are likely to be more accurate than the random effects ones, since they deal with potential endogeneity biases and are consistent no matter what is the form of the dependence between the regressors and the unobserved household effect.

The first difference with the random effects estimates is that the employment status of the husband only affects the family's propensity to move within the same region. The second difference has to do with the effect of interest. Working wives only lower the family's probability of moving if the couple has at least one child and it lives in a Southern European country. As opposed to the random effects estimates, where that effect was limited to inter-regional moves, this effect is now found for both inter- and intra-regional moves and it is substantially larger in the former case. Moreover, the inter-regional effect is also much larger than the random effects one. According to these estimates, the deterring effect of the wife working, having one or more children and living in a Southern European country is larger than the homeownership effect.

Families in which the wife has never changed region of residence are more likely to have the maternal grandmother nearby and, thus, to receive help flows in the form of grandparenting. Living in a Southern European country should exert a higher deterring impact on the family's propensity to move if the mother works and she has never changed region of residence, since its mobility costs are likely to be higher in this case. Estimates in Table 11 confirm this hypothesis. Fixed effects estimates show that the negative migration effect of the wife's employment status is only significant when looking at families with children where the wife has never changed region of residence and living in a Southern European country. Furthermore, that effect is larger for inter- than for intra-regional moves and the inter-regional effect is also larger than the one estimated in Table 10 without restricting to the wife living in the same region since birth.

Finally, a further check is performed by estimating fixed effects models where the employment status of the husband replaces that of the wife in the interaction terms that identify the effect of interest. Given that most of the time parents devote to care for their children is provided by the mother, living in Southern Europe is expected to deter family migration to a lower extent when the father, rather than the mother, works. Estimates in Table 12 confirm this hypothesis. Southern European families in which the father works

²⁹The fixed effects logit estimator identifies the effect of time-varying regressors by restricting to observations for which the dependent variable changes during the sample period. This explains that the number of observations used in a fixed effects model is lower than that in the equivalent random effects estimation.

do not differ in their inter-regional migration behaviour from observationally equivalent families living in other European countries. On the contrary, these Southern European families are less prone than their European counterparts to move to a new location within their region of residence, with that effect being close to that estimated when considering the wife’s employment status.

Fixed effects logit estimates are used to construct predicted probabilities. In the reference family both spouses are employed, they have no children and live in a rented house in 1999. Their probability of moving to another region is 4.47 percent. The probability for families with the same characteristics as the reference family but living in a house of their own is 1.40 percent. Alternatively, the reference probability reduces to 0.47 percent if the couple have at least one child, the wife works and they live in a Southern European country. That is, the reduction in the reference probability is of approximately 90 percent in the latter case.

These findings confirm the predictions of the theoretical model: a family’s propensity to move will be lowest if the wife works, they have at least one child, they live in a country characterized by a poor provision of formal childcare services, they have access to childcare services provided by immobile relatives and mobility is defined over long distances.

5 Conclusions

This paper presents a novel hypothesis to explain the low inter-regional mobility that characterizes Southern European countries by focusing on the factors determining the mobility of the most mobile collective: emancipated young adults. I argue that Southern European mothers take advantage of the low labour force participation rate of their own mothers to reconcile work and family life and, thus, are less prone to move to another region than their counterparts living in other developed countries.

Working mothers living far from their own mothers lose the childcare services the latter provide, which dampens mobility when alternative services of similar cost and quality are unavailable. This disincentive migration effect is likely to be particularly relevant in Southern European countries for two reasons. First, these countries have the highest stock of potential caretakers within the family network since they have the lowest labour force participation and employment rates of women aged over 45 years old within developed countries. Second, publicly provided childcare is severely rationed in these countries both in the number of places available and in the number of hours of care offered and, due to strict regulations, private provision is scarce.

At the macroeconomic level, I document that developed countries with the lowest inter-regional migration rates are those with the highest levels of the following variables:

percentage of emancipated women living close to their mothers, intergenerational gap in female labour force participation and employment rates, degree of rationing in the public provision of childcare services, and time transfers from the mother to her emancipated daughters in the form of grandparenting. Moreover, a lower proportion of women remain childless at the end of their fertile period in these countries.

I develop a partial equilibrium job search model that addresses these findings and I use the model to simulate the effects of several experiments. Simulation results show that a reduction in the price of private childcare services is more effective in increasing wives' employment chances, the proportion of couples with children in the economy and the inter-regional mobility of the population than an increase in the availability of publicly financed childcare slots. Thus, the dramatic increase in the number of foreign immigrants living in Southern European countries in the last few years might partially solve this puzzle, since foreign immigration increases the supply of unskilled labour and, thus, reduces the relative price of services that are intensive in unskilled time such as personal services like childcare services.

At the microeconomic level, I use data from the European Community Household Panel for the years 1994-2001 to analyze the factors that influence European families' propensity to move. Estimates show that families with children in which the wife works move significantly less than equivalent childless couples only if they live in a Southern European country. That effect is found for both inter and intra-regional migrations but is substantially larger in the former case. Families are less likely to change region of residence if the wife works, they have one or more children and live in a Southern European country than if they live in a house of their own.

6 Appendix

6.1 Simulation of the model

I have drawn a sample of 250.000 random couples. The offer arrival rates and the random layoff rate are calibrated by pooling data for the 12 countries in the ECHP and for the eight waves available. The hourly price of public childcare services is such that working mothers always prefer to use these services if they are granted access to them, that is, $w_{2,t}^j > \pi_1$, for $j = \{A, B\}$ and $t = \{0, 1\}$. The hourly price of private childcare services is calibrated using data from the Spanish Household Budget Survey (Encuesta Continua de Presupuestos Familiares) (INE, 2005) for the years 2002-2003.

The income limit for public childcare (\bar{w}) is such that the proportion of couples that gain access to public childcare coincides with the average of the number of publicly financed childcare slots for children under three years per hundred children, for the countries in Table 7. The value of I is set at the average of the number of hours of grandparenting time received by couples living less than 25 kilometers away from the maternal grandmother for the countries in Table 2.

In order to condition on the wage earned by each spouse, I discretize the distribution of wages using ten intervals. Wage offers are drawn from a lognormal distribution function with mean 1.5 and standard deviation 0.5. The value of φ is calibrated using data from the Spanish Institute of Family Policy (Instituto de Política Familiar) on the cost of raising a child for children under three years once childcare costs are excluded from the analysis.

Parameter u_0 is set to guarantee that a significant proportion of couples have a child, given the values of the other parameters. Finally, if the wife accepts a job offer she must supply 40 hours per week at work. The remaining parameters are taken from Barcelo (2003). The value of each alternative in $t = 0$ includes an expected term reflecting the fact that the choice they make in that period will affect their utility in the following period. I evaluate this term using 15.000 random observations for each group of wage offers $(w_{1,t}^j, w_{2,t}^j)$.

Table A1: Parameter values of the benchmark economy

Parameter	Value
u_0	1.13
β	0.98
α	0.5
λ_0	0.35
λ_1	0.45
δ	0.05
\bar{w}	5220
π_0	0.35
π_1	0.7
φ	675
T	2080
b	$0.33\mu_w$
μ_w	1.5
$\sigma_{\ln w}$	0.47

6.2 Database description

Table A2: Descriptive statistics of the sample used in the estimation

	Finland	France	UK	Greece	Italy	Portugal	Spain
Employment status							
Husband							
Employed	93.64	94.99	94.85	94.24	93.75	97.22	90.09
Wife							
Employed	67.57	61.56	66.11	40.12	44.18	64.73	37.23
Unemployed	8.56	8.92	1.30	9.79	6.03	6.65	11.37
Childless	27.78	24.87	35.93	24.19	29.84	28.14	31.52
Live same region since birth							
Male	30.31	59.47	77.79	62.43	80.51	86.04	70.84
Female	25.53	61.18	76.67	64.17	77.17	87.74	73.29
Husband's educational level							
Tertiary	39.98	23.02	54.98	29.05	10.39	8.28	28.12
Upper secondary	45.31	39.56	12.29	38.45	42.07	14.62	20.58
Wife's educational level							
Tertiary	51.18	27.20	43.66	27.35	8.93	10.69	25.80
Upper secondary	37.52	34.55	14.65	36.75	44.85	13.08	20.65
Homeowners	76.97	58.29	83.55	70.39	71.44	71.67	83.24
Husband's age	36.27	36.09	35.43	37.43	37.06	36.70	36.32
	(5.27)	(5.57)	(5.37)	(5.05)	(5.19)	(5.33)	(5.34)

Notes: I report percentages and mean and standard deviation (in brackets) for discrete and continuous variables, respectively.

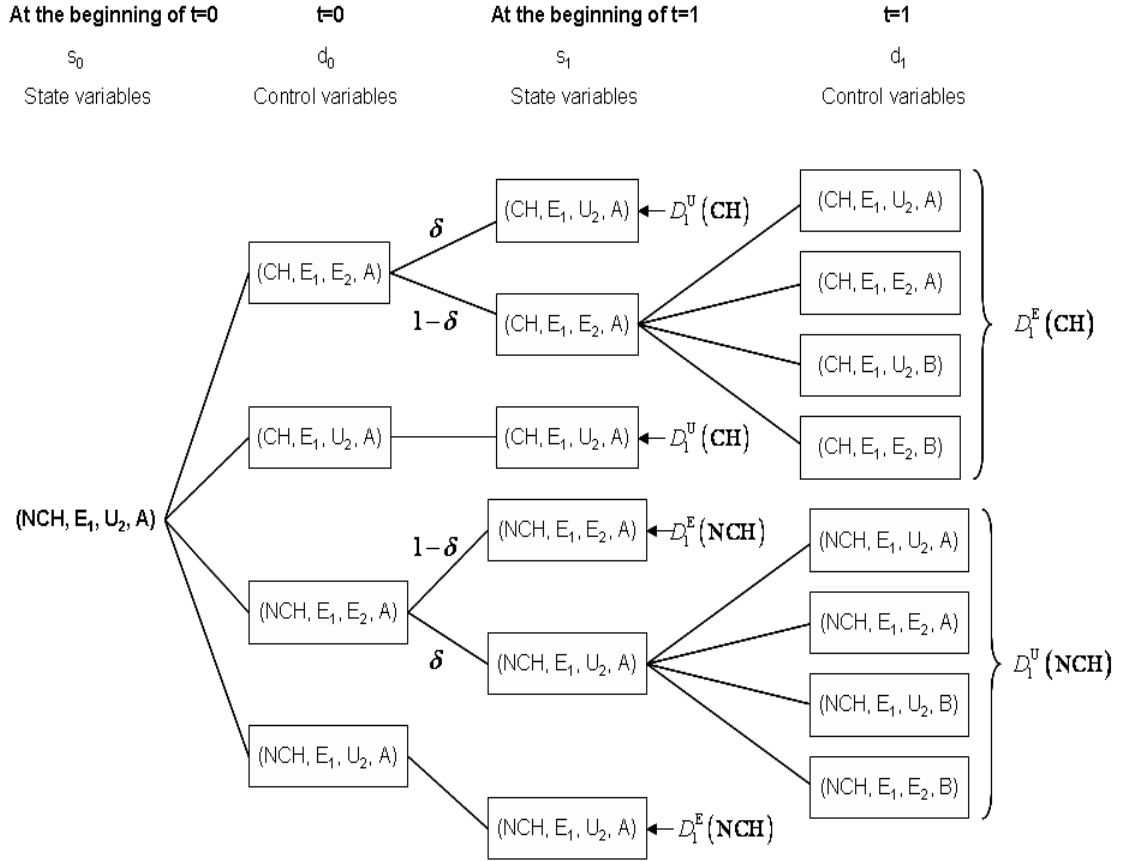
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Figure 1. Structure of the model



where E_j and U_j indicate if the husband ($j = 1$)/the wife ($j = 2$) is employed or unemployed, respectively, CH and NCH indicate if the couple have a child or not, respectively, A and B are the two regions in the economy and δ is the layoff rate.

Figure 2. Effect of an increase in the number of publicly financed childcare slots

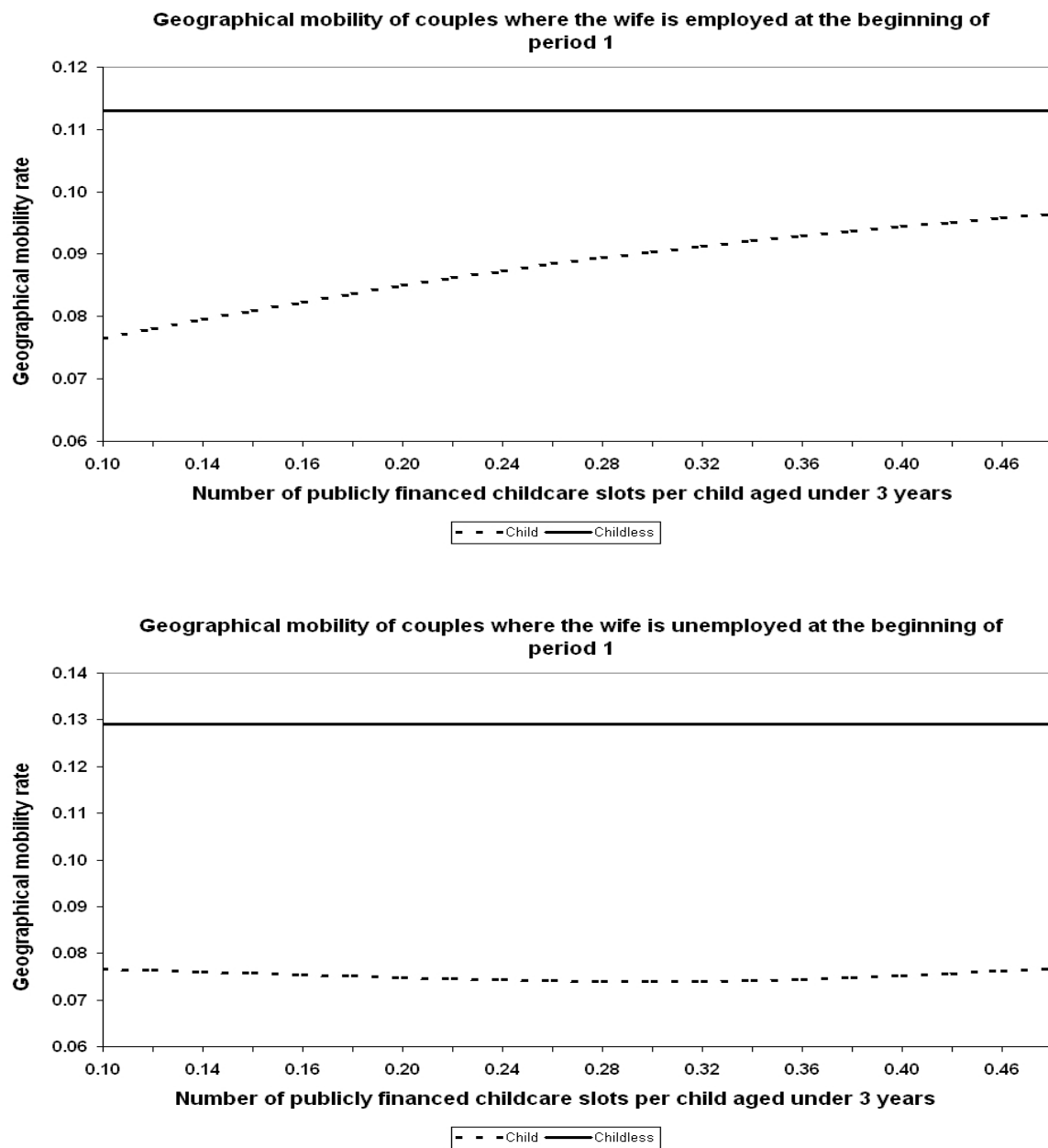


Figure 3. Effect of an increase in the price of private childcare services

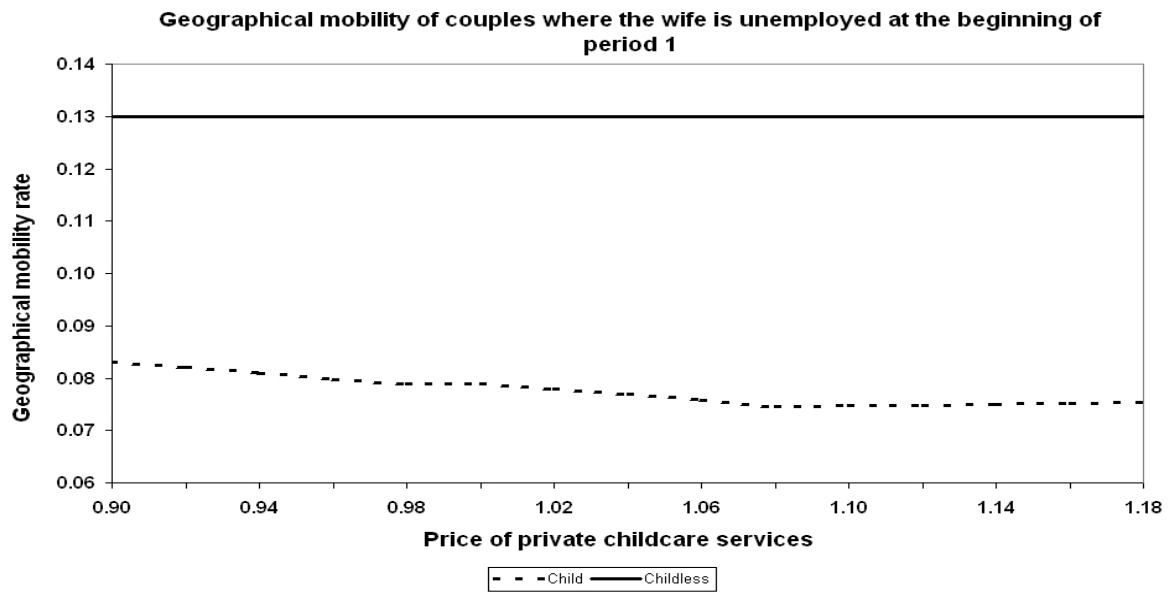


Figure 4. Effect of an increase in the price of public childcare services

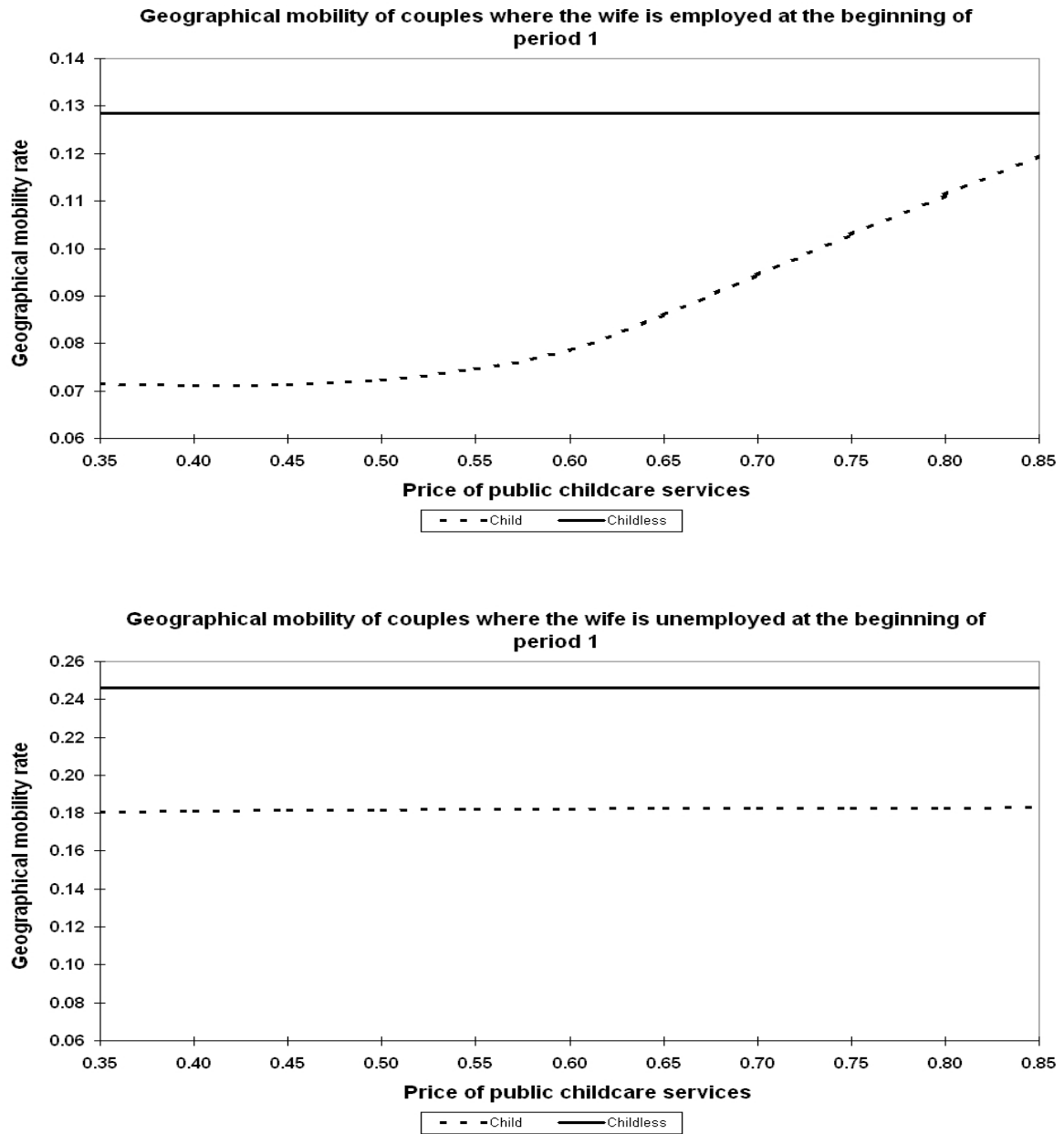


Figure 5. Effect of an increase in the availability of unpaid childcare time

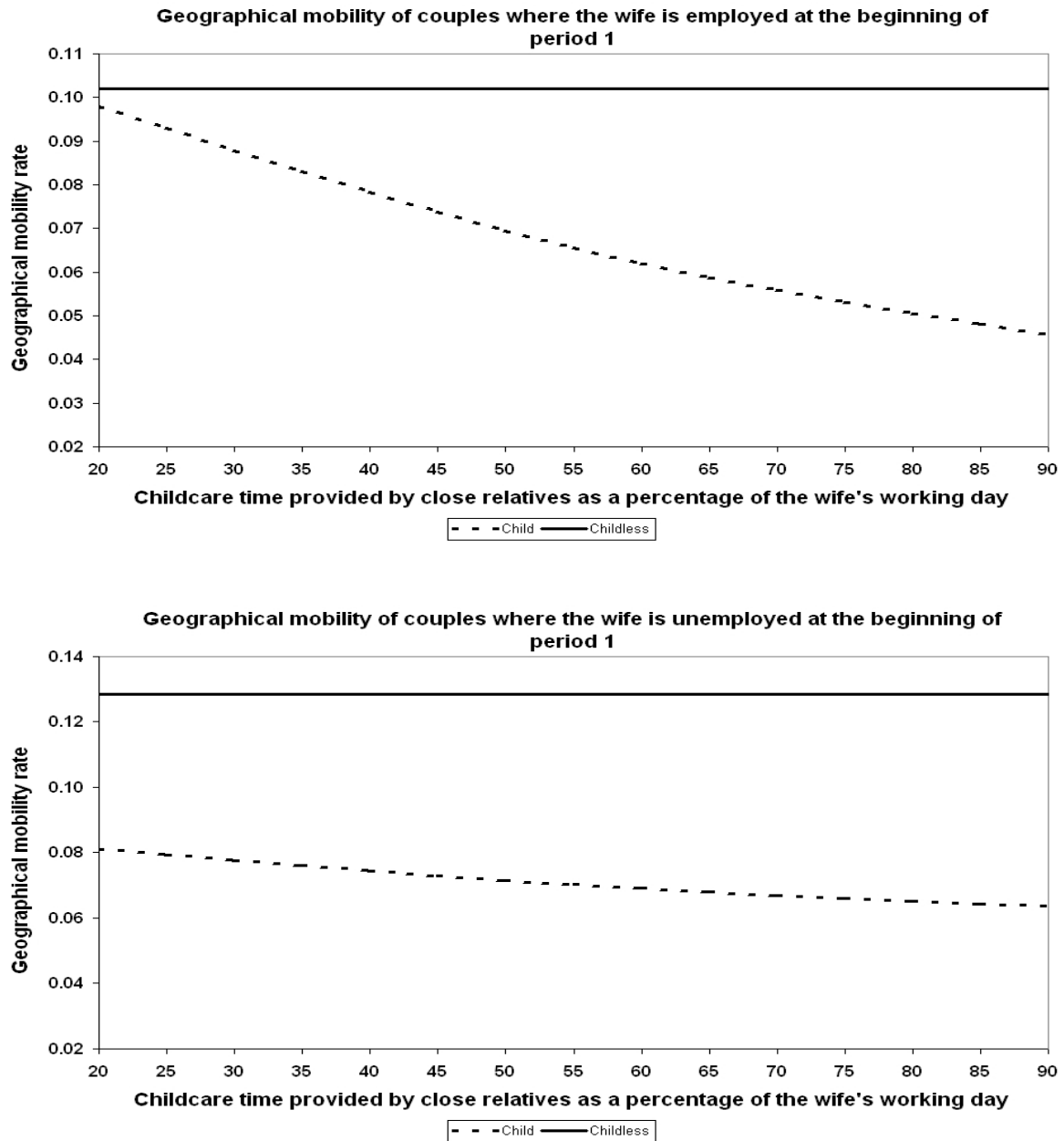


Table 1. Gross internal migration flows as a percentage of the population aged 15-64

Country	Inter-regional ^a						Intra-regional ^b
	Educational attainment						
	Age groups			Less than			
	Total	15-24	25-64	upper second.	Upper second.	Tertiary	
Southern European countries							
Greece	0.21	0.56	0.13	0.12	0.25	0.44	2.38
Italy	0.58	n.a.	n.a.	n.a.	n.a.	n.a.	2.48
Portugal	0.54	n.a.	n.a.	n.a.	n.a.	n.a.	3.33
Spain	0.20	0.23	0.19	0.13	0.23	0.33	3.90
Other European countries							
France	2.11	3.79	1.70	1.16	1.98	4.13	4.21
Germany	1.36	2.27	1.18	0.97	1.35	1.97	2.58
Sweden	1.79	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United Kingdom	2.28	3.80	1.94	1.16	1.93	3.90	4.08
Non-European countries							
Australia	2.01	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	0.95	1.55	0.8	n.a.	n.a.	n.a.	n.a.
Japan	2.21	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States	3.05	4.09	2.77	2.34	3.00	3.53	n.a.

Notes: ^a Gross outflows as a percentage of the population aged 15 to 64 years, 2003 (2001 for Greece, Japan and Sweden, 2002 for France and Italy). Source: OECD (2005). ^b Author's calculations pooling ECHP data for the years 1994-2001.

Table 2. Grandparenting time and the residential location of emancipated women

Country	Daughters living close ^a (%)	Grandparenting Frequency ^c	Daily basis ^d	Grandparenting (weekly hours) ^e		
				Daughters living		
				All	Close	Far
Greece	82.0	56.6	51.8	36.0	36.6	14.9
Italy	82.3	66.5	63.1	25.3	26.2	8.2
Spain	83.7	54.0	55.2	24.4	25.2	9.5
France	57.4	53.7	18.2	14.9	15.3	8.8
Germany	67.4	65.4	22.1	9.4	10.6	4.7
Sweden	57.3	59.5	5.4	5.9	6.3	5.2
United States	44.4 ^b	35.8	n.a.	5.2	6.7	6.6

Notes: ^a Percent of daughters living less than 25 kilometers away from their mothers. ^b Percent of daughters living less than 10 miles (16.1 kilometers) away from their mothers. ^c Percent of grandparents that take care of their grandchildren at least one hour a week. ^d Percent of grandparents that take care of their grandchildren on a daily basis among those taking care of their grandchildren at least one hour a week. ^e Average over respondents taking care of their grandchildren at least one hour a week. Source: Author's calculations using SHARE and HRS data.

Table 3. Grandparenting time received by couples living close to the maternal grandmother^a

Country	Mother's labour status		Age youngest grandchild					
			All			Employed mothers		
	Employed	Non-employed	< 3	3 to 6	≥ 6	< 3	3 to 6	≥ 6
Greece	40.1	28.8	41.0	32.7	27.1	43.3	40.2	29.2
Italy	29.3	22.6	20.8	26.3	34.1	30.7	30.2	31.5
Spain	28.2	18.3	32.9	27.7	12.4	43.4	30.7	15.1
France	15.9	10.7	16.2	13.5	17.7	16.0	14.4	20.5
Germany	13.1	6.6	10.0	12.9	8.7	14.0	14.9	11.2
Sweden	5.6	5.7	4.3	9.2	6.3	4.4	9.0	5.9
United States	7.5	3.3	6.7	6.7	6.7	7.6	7.5	7.5

Notes: ^a Living less than 25 kilometers away from the mother in European countries and less than 10 miles away in the United States. Source: Author's calculations using SHARE and HRS data.

Table 4. Labour force participation rates by sex and age groups

Country	Females					Males				
	25-34	35-44	45-54	55-64	(3) over (1)	25-34	35-44	45-54	55-64	(7) over (5)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	
Southern European countries										
Greece	66.1	61.7	45.3	24.5	68.6	95.0	97.0	91.4	59.3	96.3
Italy	60.7	58.9	44.2	15.2	72.8	87.9	96.0	87.4	44.9	99.4
Portugal	81.1	78.7	65.8	38.1	81.1	92.7	95.1	90.8	63.2	97.9
Spain	69.6	59.6	42.3	20.8	60.8	92.4	95.2	90.7	57.5	98.2
Other European countries										
Finland	77.6	87.8	87.3	41.5	112.5	90.9	92.7	87.3	45.4	96.0
France	78.0	79.2	75.6	31.6	96.9	94.1	96.4	93.4	42.0	99.2
Germany	74.3	77.1	72.8	32.8	97.9	91.1	96.0	92.7	54.2	101.7
Norway	80.2	84.4	81.6	59.5	101.8	90.8	93.3	91.0	73.8	100.2
Sweden	82.0	88.4	88.5	64.5	107.9	89.2	92.4	91.6	71.8	102.7
United Kingdom	73.2	76.6	75.4	40.8	102.9	93.7	93.1	88.8	63.2	94.7
OCDE	66.2	69.7	66.2	37.4	100.1	93.5	94.7	90.5	63.1	96.8
Std. Dev	6.4	9.7	14.4	14.2		2.1	1.8	2.6	12.3	
Non-European countries										
Australia	68.3	70.9	68.4	31.3	100.1	92.8	92.2	87.9	60.9	94.7
Canada	77.7	79.0	73.2	38.0	94.2	91.4	92.4	88.8	59.4	97.1
Japan	62.1	65.8	69.8	49.2	112.3	97.0	97.9	97.4	84.9	100.5
United States	75.6	77.3	75.7	50.4	100.2	93.1	92.6	89.0	67.1	95.6

Notes: We report average values for the period 1994-2000. Source: OECD Database on Labour Force Statistics (online).

Table 5. Employment rates by sex and age groups

Country	Females					Males				
	25-34	35-44	45-54	55-64	(3) over (1)	25-34	35-44	45-54	55-64	(7) over (5)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	
Southern European countries										
Greece	54.0	55.3	41.6	23.6	77.1	86.9	93.4	88.1	57.3	101.5
Italy	49.5	52.9	41.4	14.6	83.6	78.2	91.7	84.3	43.0	107.7
Portugal	74.7	74.4	62.8	37.0	84.1	87.7	91.6	87.1	60.2	99.4
Spain	49.0	46.3	35.0	18.4	71.5	76.6	85.4	82.2	51.3	96.9
Other European countries										
Finland	66.9	78.7	79.1	35.3	118.3	80.0	83.5	78.3	38.2	97.9
France	65.5	69.8	68.5	29.0	104.6	83.2	88.8	86.4	38.6	103.8
Germany	68.0	70.2	65.7	27.8	96.6	84.3	89.5	86.1	47.5	102.1
Norway	76.6	82.1	80.2	58.6	104.7	86.4	90.5	88.9	72.1	102.8
Sweden	74.1	82.5	84.4	60.6	113.9	80.4	85.1	85.9	65.8	106.9
United Kingdom	68.6	72.8	72.5	39.3	105.8	86.1	87.2	83.3	58.0	96.7
OCDE	60.4	65.3	63.0	35.7	104.3	87.3	90.2	86.5	59.5	99.1
Std. Dev	8.3	10.4	14.4	13.8		4.2	3.3	3.7	12.1	
Non-European countries										
Australia	63.6	66.7	65.0	30.0	97.9	85.6	86.7	83.0	56.0	97.0
Canada	71.3	73.2	68.4	35.3	104.2	83.1	85.5	83.0	54.9	99.9
Japan	58.6	63.9	68.2	47.9	86.0	93.3	95.5	95.0	80.2	101.8
United States	71.7	74.2	73.4	48.9	97.6	89.0	89.3	86.2	64.9	96.9

Notes: We report average values for the period 1994-2000. Source: OECD Database on Labour Force Statistics (online).

Table 6. Tertiary education attainment by sex and age groups. 2003

Country	Females					Males				
	25-34	35-44	45-54	55-64	(3) over (1)	25-34	35-44	45-54	55-64	(7) over (5)
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	
Southern European countries										
Greece	27.5	23.9	15.0	7.9	54.6	21.8	25.6	22.8	15.6	104.6
Italy	17.1	12.6	10.6	5.7	62.3	12.1	11.3	11.3	8.7	93.7
Portugal	23.5	15.1	11.0	6.7	46.7	13.7	10.4	8.5	6.7	61.9
Spain	42.4	29.0	17.4	8.4	41.1	34.1	27.7	21.5	16.6	63.1
Other European countries										
Finland	46.7	47.1	35.6	23.7	76.3	29.7	32.9	29.4	27.0	99.1
France	41.5	24.7	18.5	13.5	44.5	34.7	22.4	17.3	15.3	50.0
Germany	22.5	23.1	21.4	14.6	95.0	23.3	30.5	31.0	31.1	132.8
Norway	45.8	36.6	30.3	20.2	66.0	32.8	31.7	28.5	26.3	86.8
Sweden	47.1	38.3	36.1	28.8	76.6	37.7	33.2	29.8	25.8	79.0
United Kingdom	34.6	28.8	26.2	21.0	75.8	34.7	30.0	28.4	23.6	81.8
OECD average	37.0	30.0	25.0	18.0	67.6	29.0	27.0	24.0	21.0	82.8
Non-European countries										
Australia	40.7	32.4	32.0	22.2	78.6	31.5	29.8	29.6	23.8	93.8
Canada	59.8	50.7	43.4	34.7	72.5	46.8	43.3	39.3	34.3	83.9
Japan	54.0	44.0	29.0	14.0	53.7	49.4	46.5	36.1	24.3	73.2
United States	41.9	41.1	40.8	33.1	97.4	36.2	37.8	40.5	39.6	111.9

Source: OECD Education at a Glance 2006 (online).

Table 7. Summary indicators of childcare arrangements in selected OECD countries

Country	Publicly provided slots per hundred children	Proportion of children using formal childcare
Southern European countries		
Greece	3	3
Italy	6	6
Portugal	12	12
Spain	2	5
Other European countries		
Finland	21	n.a.
France	23	29
Germany (Western)	3	10
Germany (Eastern)	36	36
Sweden	33	48
United Kingdom	2	34
Non-European countries		
Australia	2	15
Canada	5	45
Japan	n.a.	13
United States	1	54

Source: Statistics in columns 1 and 2 are taken from Wrohlich (2005) and from The Family Policy Database, version 2, Luxembourg Income Study (2003), respectively.

Table 8. Family size among women aged 40-64 with completed fertility

Country	Distribution by number of children (%)				
	Average	None	1 or 2	3 or more	Total
Southern European countries					
Greece	2.00	7.6	65.2	27.2	100
Italy	1.86	11.0	65.4	23.6	100
Portugal	2.61	8.7	53.0	38.3	100
Spain	2.25	8.4	55.7	35.9	100
Other European countries					
Finland	2.14	16.0	48.7	35.3	100
France	2.31	6.8	55.6	37.7	100
Germany	1.85	12.0	64.3	23.7	100
Sweden	2.03	10.1	60.3	29.6	100
United Kingdom	2.33	7.5	57.5	34.9	100
Non-European countries					
Canada	2.00	15.6	55.1	29.4	100
United States	1.93	17.9	n.a.	n.a.	n.a.

Source: Eurobarometer 2002 and Eurobarometer 56.2. Question: Have you had any children? (If yes) How many? Data for Canada and the United States come from the Family and Fertility Survey and the U.S. Census Bureau, Current Population Survey, June 2002, respectively.

Table 9. Inter- and intra-regional mobility rates by country

Country	All ^a		Both spouses aged 25 to 45 years ^a		Groos flows ^b
	Inter-regional %	Intra-regional %	Inter-regional %	Intra-regional %	
Southern European countries					
Greece	0.47 (170)	2.38 (859)	0.47 (60)	3.80 (484)	0.21
Italy	0.24 (122)	2.48 (1275)	0.42 (81)	3.91 (760)	0.58
Portugal	0.22 (85)	3.33 (1259)	0.35 (42)	5.55 (665)	0.54
Spain	0.51 (233)	3.90 (1785)	0.75 (126)	6.29 (1062)	0.20
Other European countries					
Finland	2.25 (393)	3.93 (687)	1.50 (111)	3.97 (293)	1.60 ^c
France	1.63 (788)	4.21 (2037)	2.09 (373)	6.16 (1100)	2.11
Germany	1.13 (155)	2.58 (355)	1.32 (71)	3.21 (173)	1.36
United Kingdom	3.33 (1192)	4.08 (1458)	3.17 (417)	4.28 (564)	2.28

Notes: ^a Percent of movers from ECHP and number of moves in parenthesis. ^b Gross outflows as a percentage of the population aged 15 to 64 years, OECD (2005). ^c Gross outflows as a percentage of the general population, OECD (2000).

Table 10. Inter- and intra-regional family migration. Random and fixed effects estimates

	Random effects		Fixed effects	
	Inter-regional	Intra-regional	Inter-regional	Intra-regional
Husband employed	0.198*	0.157***	-0.248	0.344**
	[1.85]	[2.87]	[-0.72]	[2.32]
Wife employed	-0.096	-0.041	0.041	0.069
	[-1.37]	[-0.91]	[0.21]	[0.58]
Wife employed, children	0.015	0.090*	0.244	0.237
	[0.20]	[1.78]	[0.99]	[1.61]
Wife employed, children, SE ^a	-0.265*	0.041	-1.872***	-0.372**
	[-1.90]	[0.76]	[-2.69]	[-2.08]
Children (presence)	-0.085***	-0.014	-0.123	0.036
	[-2.99]	[-0.85]	[-0.85]	[0.54]
Homeowners	-0.522***	-0.804***	-1.084***	-1.759***
	[-10.51]	[-29.10]	[-5.07]	[-15.90]
Husband's age			0.717**	-0.634***
			[2.17]	[-3.85]
Husband's age squared			-1.086**	0.829***
			[-2.19]	[3.37]
Husband' age				
30-34	-0.039	-0.104***		
	[-0.68]	[-2.97]		
35-39	-0.068	-0.228***		
	[-1.10]	[-6.12]		
40-45	-0.288**	-0.279***		
	[-2.38]	[-4.63]		
Tertiary level (Husband)	0.259***	0.128***		
	[4.27]	[3.44]		
Upper secondary level (H)	0.090	0.033		
	[1.40]	[0.98]		
Tertiary level (Wife)	0.210***	0.069*		
	[3.49]	[1.85]		
Upper secondary level (W)	0.053	0.013		
	[0.83]	[0.39]		
Always same region (H)	-0.082	-0.054*		
	[-1.64]	[-1.82]		
Always same region (W)	-0.210***	-0.090***		
	[-4.25]	[-3.03]		
Constant	-1.93	-0.882		
	[-12.94]	[-11.16]		
Log-Likelihood	-1775.70	-5716.73	-627.21	-2782.95
ρ	0.071	0.051*		
	[1.64]	[1.84]		
N	24314	27904	2007	9533

Notes: t-ratios in brackets. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

^a SE denotes that the family live in a Southern European country. Random effects estimates include year and regional dummies and the mean of time-varying regressors. Fixed effects estimates include year dummies.

Table 11. Family migration and previous migration experiences. Random and fixed effects estimates

	Random effects		Fixed effects	
	Inter-regional	Intra-regional	Inter-regional	Intra-regional
Husband employed	0.195*	0.159***	-0.248	0.344**
	[1.82]	[2.91]	[-0.72]	[2.31]
Wife employed	-0.095	-0.042	0.043	0.074
	[-1.36]	[-0.94]	[0.22]	[0.62]
Wife employed, children	-0.053	0.133**	0.174	0.118
	[-0.59]	[2.32]	[0.60]	[0.69]
Wife employed, children, NM ^a	0.122	-0.085	-0.030	0.113
	[1.26]	[-1.35]	[-0.08]	[0.54]
Wife employed, children, NM and SE ^b	-0.508**	0.093	-2.254**	-0.357
	[-2.46]	[1.51]	[-1.99]	[-1.61]
Children (presence)	-0.084***	-0.015	-0.122	0.036
	[-2.94]	[-0.92]	[-0.84]	[0.54]
Homeowners	-0.517***	-0.805***	-1.087***	-1.759***
	[-10.40]	[-29.14]	[-5.10]	[-15.90]
Husband's age			0.710**	-0.631***
			[2.15]	[-3.83]
Husband's age squared			-1.079**	0.824***
			[-2.18]	[3.35]
Husband's age				
30-34	-0.039	-0.103***		
	[-0.69]	[-2.95]		
35-39	-0.069	-0.227***		
	[-1.11]	[-6.10]		
40-45	-0.293**	-0.278***		
	[-2.42]	[-4.61]		
Tertiary level (Husband)	0.259***	0.128***		
	[4.26]	[3.44]		
Upper secondary level (H)	0.085	0.036		
	[1.31]	[1.06]		
Tertiary level (Wife)	0.213***	0.068*		
	[3.53]	[1.82]		
Upper secondary level (W)	0.052	0.014		
	[0.81]	[0.40]		
Always same region (H)	-0.084*	-0.054*		
	[-1.67]	[-1.79]		
Always same region (W)	-0.228***	-0.073**		
	[-3.97]	[-2.02]		
Constant	-1.921	-0.896		
	[-12.79]	[-11.13]		
Log-Likelihood	1773.66	-5715.63	-628.64	-2783.78
ρ	0.080	0.048		
	[0.040]	[1.151]		
N	24314	27904	2007	9533

Notes: t-ratios in brackets. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

^a NM denotes that the wife has never changed region of residence. ^b SE denotes that the family live in a Southern European country. Random effects estimates include year and regional dummies and the mean of time-varying regressors. Fixed effects estimates include year dummies.

Table 12. Family migration, the husband's employment status and the presence of children. Fixed effects estimates

	Inter-regional		Intra-regional	
	(1)	(2)	(1)	(2)
Wife employed	0.074 [0.47]	0.062 [0.39]	0.135 [1.55]	0.137 [1.58]
Husband employed	0.035 [0.09]	0.005 [0.01]	0.327* [1.90]	0.325* [1.89]
Husband employed, children	-0.413 [-1.43]	-0.294 [-0.87]	0.295* [1.84]	0.260 [1.46]
Husband employed, children, NM ^a		-0.470 [-1.14]		-0.044 [-0.19]
Husband employed, children, NM and SE ^b	-0.110 [-0.21]	0.949 [1.42]	-0.591*** [-3.25]	-0.615*** [-2.67]
Children (presence)	0.034 [0.23]	0.042 [0.27]	0.045 [0.62]	0.047 [0.63]
Homeowners	-1.070*** [-5.03]	-1.075*** [-5.06]	-1.765*** [-15.93]	-1.772*** [-15.97]
Husband's age	0.731** [2.22]	0.712** [2.16]	-0.632*** [-3.83]	-0.629*** [-3.81]
Husband's age squared	-1.098** [-2.21]	-1.067** [-2.15]	0.827*** [3.36]	0.824*** [3.35]
Log-Likelihood	-630.50	-629.27	-2779.99	-2779.40
<i>N</i>	2007	2007	9533	9533

Notes: t-ratios in brackets. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

^a NM denotes that the wife has never changed region of residence. ^b SE denotes that the family live in a Southern European country. Random effects estimates include year and regional dummies and the mean of time-varying regressors. Fixed effects estimates include year dummies.